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A Report Prepared for the

Legislative Finance Committee

by

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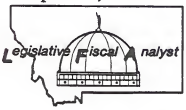
April 7, 1992



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EXECUTIVE SUMMARY

The 1985 legislature created the Montana Science and Technology Alliance (MSTA) in the Department of Commerce to strengthen and diversify Montana's economy through investments in science and technology. The 1989 and 1991 legislatures authorized MSTA to invest $12.6 million from the permanent coal trust (PCT) fund in seed capital and research and development projects. This authority expires June 30, 1994, and MSTA anticipates all PCT funds will be committed by that time. Prior to 1990, MSTA financed its projects with money from the alternative energy account and general fund. The 1993 legislature will have to decide whether to continue MSTA's authority to initiate new loans using PCT funds. This report provides an overview of the MSTA program and summarizes costs, investments, and returns to date.

MSTA operates two separate financing programs: the seed capital financing program and the research and development financing program.

Seed Capital Loans

The seed capital program provides loans to early and expansion stage companies with potential for growth, advancement of the state's economy, and return on investment. Companies can receive loans of up to $750,000 from MSTA. Loan recipients sign a loan agreement with MSTA that outlines payback provisions. Loan repayment is postponed for up to eight years so the company can use revenue as working capital instead of debt service. Loan agreements provide a method of repayment for MSTA's investment through a debt instrument

called a convertible debenture, which gives MSTA the right to convert a block of reserved company stock to cash at a negotiated price on the open market. Since the Montana constitution prohibits investment of PCT funds in private stock, MSTA owns the conversion right rather than the stock itself.

Typically, MSTA does not require collateral for these loans. To date, MSTA has required collateral (equipment, patents, or other assets) for three of its fourteen seed capital loans. It has not required collateral for $2.4 million of loans. MSTA has "written off" $90,000 of loan principal due to failure of three seed capital companies. MSTA did not have collateral for the loans to these companies.

Through December 31, 1991, MSTA had invested $3,179,925 in seed capital projects and received a return on its investment of $13,887 during the five year period since seed capital loans began. When the return is combined with the principal lost due to company failures, the net loss to MSTA from seed capital investments is $76,113. Only two of the fourteen companies that have received loans have provided any return on investment to date. Because maturity dates for loans made from the PCT fund range from 1995 through 1999, no return on the interest and principal loaned to seed capital companies is required in the near future.

Research and Development Loans

The research and development financing program was created to further technology development through the funding of research projects with technological

and commercial potential. These investments are structured as loans, although some early projects did receive grants when program rules were different.

In research and development loans, no loan maturity date is established and repayment is not required until the project product or process is commercialized. No collateral is required for these loans. If commercialization occurs, the project must repay at least two times MSTA's original investment through a percentage of the product/process income stream. The percentage is negotiable, but may not exceed the statutory limit of five percent per year.

Through December 31, 1991, MSTA had invested $2.6 million in research and development projects and received a return on its investment of $4,819. Since there are no maturity dates for research and development loans, it is impossible to tell when further returns will be received.

In Senate Bill 242, passed during the 1991 session, the legislature specified that approximately $4.1 million of the PCT funds be invested in university system projects. The bill required the Board of Regents to develop an intellectual property management program for all university research activities and present a final report and recommendations to the Montana Science and Technology Development Board by January 1, 1992. Intellectual property rights are patents, copyrights, etc., issued to the owner(s) of knowledge or technology. Intellectual property rights are valuable if the product, technology, or knowledge they protect is commercialized because the owner(s) receives income from the sale of the product or process through royalties, license fees, etc. Since MSTA's loan return comes from a percentage of the income stream generated by the product or process, it is imperative that ownership of these rights and what constitutes income

subject to the loan agreement is clearly established. The Board of Regents final report and recommendations concerning intellectual property management have not yet been presented to the MSTA Board, and intellectual property programs and policies continue to differ at each unit.

Direct and Indirect Returns on MSTA Program

During the seven years MSTA has been in existence, the program has spent $2.6 million for administrative costs and grants and invested $6.8 million. Total direct return on investment has been a loss of $71,294, which is the net of $18,706 returned to MSTA from seed capital and research and development projects and the loss of $90,000 through project failures.

When calculating the cost of MSTA, the cost of foregone interest on the PCT balance must also be considered. Until loaned by MSTA, PCT funds are invested, with the resulting interest distributed 85 percent to the general fund and 15 percent to the SEA. Once funds are disbursed to a seed capital or research and development project, no return on that investment may be received for seven years or more. During this period, the state forgoes a considerable amount of interest income, reducing general fund and SEA revenues. The MSTA program is based on the assumption that future returns on those investments will more than compensate the state for the interest foregone in the early years. By the end of fiscal 1996, when the majority of MSTA's seed capital loans start reaching maturity, the cost of foregone interest on the invested PCT funds will be approximately $3.0 million.

MSTA may not receive any significant return on its investments in the next several years. Sixty-three percent of the active seed capital loans have loan maturity dates in 1996 and beyond. Research and development loans have no loan maturity date.

In addition to the $18,706 of direct returns received, MSTA staff notes that the state has realized indirect benefits from its investments. According to unaudited information submitted to MSTA from loan recipients, MSTA funded projects have generated: 1) 223 full-time and 114 part-time jobs; 2) annual wages amounting to $3,539,210; 3) $15,984,693 of project-generated revenue; 4) matching funds of $5,820,131; and 5) $7,042,800 of non-owner equity investments.

It is difficult to determine if the reported indirect benefits would have occurred without the MSTA funding and are **entirely** due to MSTA funding. In addition to MSTA funding, several projects received funding from other state and local economic development programs.

Agency Comments

MSTA's Executive Director has prepared written comments concerning this report, which are attached.

PURPOSE

The Montana Science and Technology Alliance (MSTA) program in the Department of Commerce has authority (section 17-6-308, MCA) to invest $12.6 million of funds from the permanent coal trust (PCT) fund in new and expanding technology-based businesses and projects in Montana. MSTA invests these funds in seed capital and research and development projects to further science and technology development in the state and to strengthen Montana's economy.

The legislature authorized the MSTA Board to invest these funds for the following purposes, as stated in section 90-3-101, MCA.:

> "....(to) strengthen an diversify the state's economy by facilitating a public sector-private sector partnership to encourage scientific and technological development within the state in order to keep pace with a changing economic structure and to create new jobs and expand business opportunities.....(which) will be fostered by assisting in the acceleration of development of technology in the state through participation with the private sector in the financing of science and technology development projects that have significant potential for commercialization in Montana.....(using) the permanent coal tax trust fund created by Article IX, section 5, of the Montana constitution (which) is the appropriate source for providing financing programs for the development of new and expanding businesses in Montana, and (since) the Montana Science and Technology Development Board has demonstrated success in forging a partnership among the private sector, the university community, and government,...this success should be continued through an ongoing legislative commitment to the Board's programs."

MSTA's authority to invest PCT funds expires June 30, 1994. The 1993 legislature will be faced with the decision of whether to continue MSTA's authority to initiate new loans using PCT funds. This report provides an overview of program accomplishments to date.

BACKGROUND

History of the Program

In 1985, the legislature established the Montana Science and Technology Development Board and appropriated $2 million from the alternative energy coal tax account for MSTA administrative costs, grants, and loans.

The Seed Capital Bond Act (House Bill 700), enacted by the 1987 legislature, authorized the Board to issue up to $16 million of bonds backed by the PCT to finance the technology investment program. Funding for MSTA administrative costs was from the alternative energy account and anticipated bond proceeds.

In July, 1988, the Montana Supreme Court ruled that the Seed Capital Bond Act was unconstitutional (White v. State of Montana, 759 P.2d 971) because it pledged the state's credit as security for bonds to benefit private companies. For MSTA, this ruling was significant because: 1) it eliminated anticipated funding from the bond proceeds, some of which MSTA had already committed to projects; and 2) it split program history into pre-White and post-White periods. All investments made with funds appropriated prior to the White case are considered "pre-White", while all investments made with PCT funds are considered "post-White". These are critical distinctions in payback of principal, interest and earnings.

In response to the White ruling, the 1989 legislature enacted the Science & Technology Financing Act (House Bill 683) which: 1) gave MSTA authority to invest $7.5 million from the PCT fund in seed capital projects; 2) corrected deficiencies of previous legislation; and 3) re-established the Science and Technology

Development Board. General fund of $948,458 was appropriated to MSTA for the biennium, which included $214,988 for research and development investments.

During the 1989 session, the legislature also authorized the Board to administer a $2 million grant to the McLaughlin Medical Research Center in Great Falls for construction and start up expenses. The state funds appropriated were income and earnings from the PCT fund, which were to be matched with federal funds.

In addition to the general appropriations act which provided general fund for MSTA administrative costs, the 1991 legislature passed three other bills affecting MSTA:

1) Senate Bill 242, which gave MSTA authority to invest an additional $5.1 million from the PCT in research and development projects and directed the university system to evaluate its intellectual property management programs and policies;

2) House Bill 703, which amended the Science and Technology Financing Act to allow portions of the $7.5 million available for seed capital projects to be loaned: a) to private venture capital companies; and b) for projects that do not address the innovative technologies established in statute. Prior to enactment of this bill, MSTA had to give priority loan consideration to projects dealing with nine target technologies: mineral technology, agricultural technology, forestry technology, energy technology, materials sciences, information sciences, biotechnology, microelectronics and computer sciences, and hazardous waste treatment and disposal. House Bill 703 authorized MSTA to invest up to 25 percent of seed capital funds in projects not meeting these target technologies.

3) Senate Bill 105, which extended the $2 million appropriation to the McLaughlin Medical Research Center to June 30, 1993, changed the federal matching formula from 4:1 to 2 1/2:1, and added equipment as an allowable use of funds.

During the January 1992 special session, the legislature enacted House Bill 18, which transferred all MSTA state special revenue funds in excess of $50,000 to the general fund during the 1993 biennium. In addition, MSTA's general fund appropriation was reduced by $81,127 (14.7 percent) in fiscal 1992 and $75,000 (13.4 percent) in fiscal 1993.

MSTA Administrative Costs, Grants and Loans

The following table shows MSTA expenditures and FTE levels from the program's beginning in fiscal 1986 through fiscal 1991. The "grants/loans" category summarizes all MSTA pre-White investments. It does not include investments made from the PCT.

TABLE 1
MSTA Expenditures and FTE
FY 1986 - FY 1992

Budget Category	FY 1986	FY 1987	FY 1988	FY 1989	FY 1990	FY 1991	FY 1992*	Total
FTE	2.00	2.00	5.00	6.00	6.00	6.00	7.00	NA
Personal Services	$83,814	$84,318	$177,994	$117,481	$147,478	$187,858	$210,193	$1,009,136
Operating Expenses	57,215	61,548	315,787	127,845	132,670	207,994	211,845	1,114,904
Equipment	8,005	3,761	23,282	1,135	5,805	410	0	42,398
Grants/Loans**	156,578	1,366,340	1,268,836	404,240	115,000	90,000	50,500	3,451,494
TOTAL COST	$305,612	$1,515,967	$1,785,899	$650,701	$400,953	$486,262	$472,538	$5,617,932
Funding Source								
General Fund	0	0	0	0	400,953	435,850	472,538	1,309,341
State Special Revenue	305,612	1,515,967	1,705,485	658,580	0	50,412	0	4,236,056
Proprietary Funds	0	0	80,414	(7,879)	0	0	0	72,535
TOTAL FUNDS	$305,612	$1,515,967	$1,785,899	$650,701	$400,953	$486,262	$472,538	$5,617,932

*FY 92 is as appropriated in HB 2 and HB 509 (pay plan).
**From the Statewide Accounting and Budget System (SBAS), which reflects all expenditures in this category from non PCT funds. Total grants/loans shown on SBAS through fiscal year end 1991 is $459,276 greater than the total of non PCT funded projects identified in this report due to the net effect of: 1) accruals; 2) refinancing of a project loan; 3) the Board's award of $30,000 from its state special revenue account to the Montana Entrepreneurship Center; and 4) disbursal of $22,364 in fiscal year 1992.

PROGRAMS

Two financing programs are administered by MSTA: the seed capital financing program and the research and development financing program.

Seed Capital Financing Program

The Seed Capital Financing Program provides loans to early-stage and expansion-stage companies with outstanding technological and commercial potential for: 1) growth; 2) advancement of the state's economy; and 3) substantial return on investment. MSTA can loan up to $750,000 to one company, which must be disbursed in separate financing rounds of not more than $350,000 each.

MSTA evaluates business plans and makes funding recommendations to the Board for final decision-making. All funding recipients enter into a loan agreement with MSTA which specifies payback provisions. According to statute (90-3-523, MCA), loan repayment may be deferred for up to eight years, which allows companies to use revenue as working capital instead of debt service. MSTA schedules most of its loans to mature at the end of seven years, at which time repayment must begin or a negotiated purchase of the debt instrument will occur.

Seed capital loans are structured as contracted debt. The loan agreements contain provisions for payback of principal and interest, with interest rates set at a level to provide MSTA a market rate of return (currently 10.5 percent per year). Loan agreements provide a method of repayment for MSTA's investment through a company-issued debt instrument. These debt instruments (convertible debentures) give MSTA the **right** to convert a reserved block of company stock to cash at a negotiated market value. Because Article VIII, Section 13 of the Montana constitution specifically prohibits investment of PCT funds in private stock, MSTA owns this conversion right, rather than the stock itself. MSTA's goal in

the seed capital financing program is to realize seven times the state's investment in seven years. In order for this to happen, MSTA must sell some of its debt instruments at a substantial profit, since it anticipates some of the companies will fail.

Convertible debentures, the debt instrument used by MSTA, are tied to company value and backed by a commensurate amount of stock. If a seed capital company becomes successful, the value of the company and its stock increases, as does the value of MSTA's conversion right. If a company prospers, the company and/or outside investors may want to purchase MSTA's conversion right to payoff the MSTA loan or MSTA may consider selling its conversion right as it sees the value of the company stock increasing. Under MSTA policy, the company is always given the first opportunity to purchase the debt instrument. If MSTA sells its conversion right, the seed capital loan is considered repaid. Current law does not state whether MSTA has the authority to sell its conversion right for less than loan principal and accrued interest.

If a seed capital company does not prosper and MSTA is unable to sell its conversion right on the open market, statute requires that the loan be satisfied through repayment of principal and interest. However, if a company has not generated enough capital or outside interest to purchase the conversion right by the end of the seven year period, the probability of rapid or total repayment diminishes due to the uncertainty of the company's ability to repay the loan. MSTA will make repayment arrangements with these companies at loan maturity if it appears the company can make payments. While the Board has discussed policies regarding the frequency and amount of payments, no specific policies have yet been developed. Current law does not appear to provide authority for the Board to accept less than the amount of outstanding principal and interest as repayment.

If a company fails, the state's entire investment could be lost if MSTA has not taken any real or personal property as collateral for the loan. MSTA has collateral for three of the fourteen seed capital loans. This collateral consists of all assets of two companies and equipment and a patent application of the third. This collateral secures project financing of $730,750. MSTA has no collateral for the remaining $2.4 million of seed capital loans. Under Board policy, tangible assets will be required as collateral for companies headquartered outside the state that are moving to Montana as a condition of their MSTA loan. To date, $90,000 of the state's investment has been lost due to the failure of three seed capital companies. MSTA had no collateral for the loans to these companies.

According to statute (90-3-523, MCA), loan agreements must contain a provision that "the note becomes due in full upon dissolution or liquidation of the company." As noted above, the Board has not received any payment of principal or interest for three loans, which have been written off as losses due to failure and subsequent dissolution of the companies.

The following table shows MSTA seed capital investments through December 31, 1991, including the three failed companies (identified by a "0" in the "estimated current loan value" column), separated according to pre-White and post-White funding. As Table 2 indicates, MSTA has invested $3,179,925 in seed capital projects and received a return on its investment of $13,887. When the amount of return is combined with the $90,000 principal lost due to company failures, the net loss to date from MSTA seed capital investments is $76,113.

The maturity date for the loans made from the PCT fund range from 1995 through 1999, so no return on the interest and principal loaned in these investments is required in the near future.

TABLE 2
Seed Capital Investments

Company Name	Type of Business	Date Committed	Maturity* Date Range	Amount Invested	Amount Committed	Estimated Current Loan Value	Return on Investment
1) GeoResearch Inc.	Remote animal data systems	4/86	NA	$180,000	$180,000	$368,867	$2,932
2) Ercon Systems	Erosion Control Matting	4/86	NA	20,000	20,000	0	0
3) Writing Software	Desktop Publishing Software	7/86	NA	50,000	50,000	0	0
4) Automation First	Programmable Automation Controls	5/87	NA	20,000	20,000	0	0
5) InfoTech	Database/Electronic Info Exchange	2/88	1995	45,500	45,500	59,044	0
6) Employee Managed Care	Medical Patient Advocacy System	6/88	1995	100,000	100,000	129,762	0
SUBTOTAL - NON COAL TRUST INVESTMENTS				415,500	415,500	557,673	2,932
7) Basic Bio Systems	Sustained Release System	8/89	1996-1999	425,275	700,000	429,696	0
8) ChromatoChem**	High performance affinity chromatography products	12/89	1996-1997	350,000	350,000	386,750	0
9) Gateway Software**	Computer Software for IBM	1/90	1995-1998	334,150	334,150	350,509	10,955
10) Lattice Materials	Infrared Laser Optics	1/90	1997-1998	555,000	700,000	591,750	0
11) Mycotech	Fungi Related Biotechnology Products	4/91	1998	350,000	350,000	365,312	0
12) Optima Industries**	Printed Circuit Board Drilling System	7/91	1998-1999	150,000	350,000	150,000	0
13) TMA Technologies	Detecting Instruments	10/91	1999	350,000	350,000	350,000	0
14) Ultra Fem Ins.	Menstrual Collection Device	11/91	1998	250,000	350,000	250,000	0
SUBTOTAL - COAL TRUST INVESTMENTS				$2,764,425	$3,484,150	$2,874,017	$10,955
TOTAL SEED CAPITAL INVESTMENTS				$3,179,925	$3,899,650	$3,431,690	$13,887

*Maturity date is 7 years from drawdown. GeoResearch has no maturity date, as its loan agreement was developed under pre-White rules and simply requires repayment of 2¼ times the state's investment.
**MSTA has collateral for all or part of the loan.

As Table 2 indicates, more funds have been committed than invested in seed capital projects. Funds committed but not invested are maintained in either the MSTA state special revenue account or the PCT fund until disbursed. Fund disbursal is contingent upon matching funds, meeting specified project milestones, and is limited to $350,000 per project per financing round.

MSTA's estimate of current value of each seed capital loan shown in Table 2 is loan principal and accumulated interest as of September 30, 1991, plus the loan principal of all additional investments made through December 31, 1991. It does not reflect increased value of company stock. Three projects show no current value, because they failed and were written off MSTA books due to company failure and dissolution.

Return on investment (ROI) includes royalties and the increased value (over principal) realized from conversion of the debenture paid to MSTA as per loan agreements. The $13,887 ROI shown in Table 2 was received as a percentage of product sales through December 31, 1991. ROI is not considered payment of principal or interest because repayment isn't required until loan maturity. Instead, ROI in the seed capital program is considered earnings to the state. To date, MSTA has received no ROI on twelve of the fourteen investments made during the period 1986 through December 1991. Table 2 shows ROI received from both pre-White and post-White investments.

Deposit of MSTA loan proceeds is statutorily established and is governed by the pre-White/post-White distinction mentioned earlier. For projects funded with PCT funds (post-White), principal payback goes into the PCT fund, while interest

and earnings are deposited 85 percent to the general fund and 15 percent to the school equalization account (SEA). For projects funded with non-PCT funds (pre-White), all payback is deposited in the MSTA state special revenue account, which is statutorily appropriated for the Board's use. This fund was capped at $50,000 during the 1992 special session, with funds in excess of that amount to be deposited in the general fund through the end of the 1993 biennium.

Table 3 shows the amount of payback and ROI (earnings) the state has realized from seed capital investments through December 31, 1991. Of this $13,887 total, $10,955 has been deposited in the general fund and SEA.

TABLE 3
Payback & ROI
Seed Capital Investments

	MSTA Special Revenue Account	General Fund/SEA	Total
Principal	$0	$0	$0
ROI	2,932	10,955	13,887

MSTA records show an additional $136,500 of principal repayment received when a pre-White loan was refinanced with PCT funds. These funds were deposited in the MSTA special revenue account. This amount is not included as principal payback in Table 3 because the loan refinance simply substituted PCT funds for other state funds, resulting in no net gain for the state.

Research & Development Financing Program

The research and development financing program was created to help expedite technology development in the state through the funding of research projects with outstanding technological and commercial potential. MSTA evaluates research and development proposals and makes funding recommendations to the Board. Investments are structured as loans, although some early projects did receive funds in the form of a grant when program rules were different.

Funding for the research and development financing program was significantly reduced at the end of the 1989 biennium when the coal tax allocation to the alternative energy account ended. During the 1991 biennium, MSTA was appropriated $214,988 from the general fund to invest in research and development projects. After the White ruling until the 1993 biennium when PCT funds became available, the only research and development projects MSTA funded were the Center of Excellence in Engineering Research and the Montana Private Venture Capital network, which received $60,350 of the 1991 biennium general fund appropriation.

Tables 4 and 5 show research and development projects funded by MSTA with alternative energy and general fund, all of which are considered pre-White funding sources. Table 4 shows grants which received funding under pre-1989 program rules. No repayment of these grants is required.

TABLE 4
Research & Development Grants

		Date Funded	Amount Funded
1) Winter Weather Modification	MSU--Bridger Bowl	10/86	$10,157
2) Digital Soils Mapping	Montana State University	7/86	33,428
3) Detox of Chemical Waste	MSU Detox	10/86	155,000
4) MT Venture Capital Network	Development Corporation	2/86	7,100
5) Agricultural Mktg Conference	AERO	10/86	7,500
6) Extended Barley & Cattle Nutrition	Montana State University	1/87	28,740
7) Computer System for Agriculture	Northern Montana College	5/87	30,180
8) US West Research Proposal	Montana Ambassadors	5/87	50,000
9) 2nd Annual Venture Capital Forum	Montana Ambassadors	5/87	8,577
10) Biotech for Sheep Industry	Montana Wool Growers	5/87	50,600
11) Research & Tech Review Sessions	CVM Ventures	11/87	33,128
12) MT Entrepreneurs Guide	University of Montana	6/88	11,900
13) Business Incubator Center	Butte Business Dvlpmt Center	6/88	5,500
14) State Telecommunications Plan	Montana Ambassadors	6/88	40,000
TOTAL--COMPLETED RESEARCH DEVELOPMENT PROJECTS			$471,810

Table 5 shows research and development loans made from alternative energy and general fund (pre-White). These loans require repayment once the project is commercialized. The "completed projects" shown at the top of the table have been finished, and MSTA is continuing to monitor them for repayment potential and compliance. The "current projects" shown at the bottom of the table are in progress, with more funds committed than invested to date. Projects must meet loan requirements such as meeting project milestones and receiving matching funds before receiving all committed funds.

TABLE 5
Research & Development Loans

Completed Projects		Date Funded	Amount Invested	Amount Committed	Return on Investment
1) Coal Benefication	Western Energy	4/86	$350,000	N/A	$0
2) Enhancement of Computer Graphics Lab	Montana State University	7/86	81,713		439
3) Adoption of Furniture Mfg Techniques	MT Int'l Trade Commission	4/86	50,000		0
4) Development of Lodgepole Pine Joists	Wood Science Laboratory	1/87	35,000		0
5) Research capability enhancement; Institute for Process Analysis	Montana State University	10/87	28,999		4,301
6) Air Sparged Hydroclone	IPM of Montana	6/88	197,000		0
7) Incubator Feasibility Study	Billings Chamber of Commerce	6/88	15,000		0
8) Upgrade--Mass Spectrometer	University of Montana	6/88	15,000		22
TOTAL--CLOSED PROJECTS WITH PAYBACK PROVISIONS			$772,712	N/A	$4,762

Current Projects		Date Funded	Amount Invested	Amount Committed	Return on Investment
CENTERS OF EXCELLENCE					
1) Advanced Minerals & Hazardous Waste Processing	Montana Tech	2/88	$215,332	$275,000	$0
2) Biotechnology	University of Montana	2/88	288,114	325,000	0
3) Advanced Materials	Montana State University	2/88	200,000	200,000	0
4) Engineering Research	Montana State University	6/89	50,000	50,000	0
5) MT Entrepreneurship Center	University of Montana, et.al.	6/88	249,840	512,546	12
OTHER PROJECTS					
6) Medical Use of Cyclonic Resonance	Life Resonances, Inc.	5/87	125,000	125,000	0
7) Domestic Cultivation of Huckleberries	University of Montana	7/86	61,710	61,710	45
8) Phyto Availability Soil Test	Montana State University	6/88	52,600	91,200	0
9) System for Seed Potato Production	Montana State University	6/88	28,750	28,750	0
10) Develop Venture Capital Network	MT Private Capital Network	2/90	10,350	25,000	0
TOTAL--ACTIVE RESEARCH & DEVELOPMENT PROJECTS			$1,281,696	$1,694,206	$57
TOTAL PRE-WHITE FUNDED RESEARCH & DEVELOPMENT PROJECTS			$2,526,218*	N/A	$4,819

*Includes total from Table 4

Only five of the 18 "pre-White" research and development loans shown on Table 5 have made ROI payments to MSTA, which are considered loan principal until the original investment is repaid. Most of the $4,819 received to date on the $2.5 million invested in pre-White funded projects is fee income from use of university laboratories, equipment and services. Only $45 (Domestic Cultivation of Huckleberries project) was derived from product sales.

The 1991 legislature gave MSTA authority to invest an additional $5.1 million from the PCT fund in research and development projects to be allocated as follows: 1) $600,000 to meet state matching fund requirements for the National Science Foundation awards to the Center for Interfacial Microbial Process Engineering at MSU; 2) $3.5 million for loans relating to but not limited to the Centers of Excellence program and the Montana Entrepreneurship Center and to meet state matching fund requirements for the EPSCOR program; and 3) $1 million for medical facility research and development projects.

MSTA issued a request for funding proposals (RFP) last fall and began loaning PCT funds to research and development projects in December, 1991. Under this RFP, projects that lead rapidly to commercialization and job creation receive priority consideration. There are no limits to the amount of funding a project can request, and multi-year projects are acceptable. MSTA funds may not be used to pay project overhead costs. Funds require 1:1 match unless waived by the Board. Table 6 shows the investments made with this money through December, 1991.

TABLE 6
Permanent Coal Trust Funded
Research & Development Projects

		Date Committed	Amount Invested	Amount Committed	Return on Investment
CENTERS OF EXCELLENCE					
1) Biotechnology	University of Montana	1/92	$0	$350,000	0
2) Engineering Research	Montana State University	12/91	0	600,000	0
3) MT Entrepreneurship Center	University of Montana, et.al.	11/91	55,458	232,706	0
OTHER PROJECTS					
4) Billings Deaconess	Osteoporosis Research	12/91	0	500,000	0
TOTAL COAL TRUST FUNDED RESEARCH & DEVELOPMENT PROJECTS			$55,458	$1,682,706	$0

Centers of Excellence are specialized and distinct research entities within the university system established as a collaborative effort between MSTA and the university system to stimulate high quality research. There are five centers: 1) the Center of Excellence in Biotechnology at the University of Montana (UM); 2) the Center for Interfacial Microbial Process Engineering at Montana State University (MSU); 3) the Center of Excellence in Advanced Materials and Process Sciences at MSU; 4) The Center of Excellence in Advanced Minerals and Hazardous Waste Processing at Montana Tech; and 5) the Montana Entrepreneurship Center at UM with field offices at MSU and Eastern Montana College. The Centers apply for MSTA funding through the Commissioner of Higher Education (CHE). After MSTA awards a loan to a Center, the governing board at each Center makes individual awards for specific research projects at the Center (except at the Center

for Interfacial Microbial Process Engineering and the Montana Entrepreneurship Center).

Research and development loan recipients enter into a funding agreement with MSTA that outlines repayment terms. However, no loan maturity date is established, and repayment is not required until the project product or process is commercialized. No collateral is required for these loans. Under the terms of Section 90-3-524, MCA, the loan agreement must require research and development loans to return at least two times the original investment (not including interest), through a percentage of the income stream derived from the sale or other commercialization of products or processes developed with the Board's financing. The percentage of income stream paid to MSTA is negotiable and set forth in the loan agreement, but may not exceed the statutory limit of 5 percent per year.

Loans made with non-PCT funds for technology transfer and assistance projects could be "repaid" through indirect benefits. However, loans made to research and development projects from the PCT fund for technology transfer and assistance may not be repaid through indirect benefits (section 90-3-524, MCA).

If projects are successful, they may want to repay their MSTA loan in a lump sum, rather than through a percentage of product/process income stream over time. Current law (section 90-3-524, MCA) requires payback of "at least two times the original loan amount."

MSTA has the authority (section 90-3-301, MCA) to waive matching fund requirements for 25 percent of its research and development funding ($5.1 million).

To date, MSTA has waived $187,093 of the required match for Montana Entrepreneurship Center at the University of Montana.

As noted above, MSTA research and development loans have no collateral and no maturity date. The state's only return on this investment of PCT funds is a lump sum payment or a percentage of the income stream derived from sale of products/processes developed as a result of the loan.

MSTA plans to sign an "umbrella" loan agreement with the office of the CHE that will specify loan conditions and repayment requirements for all research and development loans to the Centers of Excellence and other university projects. However, the Montana Entrepreneurship Center has signed its own loan agreement with MSTA, which will become part of the "umbrella" agreement with the CHE once it is finalized.

Ownership of intellectual property rights for all projects will be stated in the "umbrella" loan agreement between MSTA and CHE. For collaborative projects, ownership of intellectual property must be resolved prior to receipt of MSTA funding. Intellectual property rights are patents, copyrights, etc., issued to the owner(s) of knowledge or technology. Intellectual property rights are valuable if the product, technology, or knowledge they protect is commercialized because the owner(s) receives income from the sale of the product or process through royalties, license fees, etc. Since MSTA's loan return comes from a percentage of the income stream generated by the product or process, it is imperative that

ownership of the rights and what constitutes income subject to the loan agreement, is clearly established in the loan agreement.

Senate Bill 242, passed during the 1991 session, required the Board of Regents to develop an intellectual property management program for all university research activities. Specifically, the legislation stated:

> "...The university system shall conduct an assessment of its intellectual property management program and policies. Based on the assessment, the Board of Regents shall consider the adoption of a system of intellectual property management that will provide a coordinated and effective method of meeting payback requirements for research and development project loans made to organizations, individuals, and other entities within the university system. This assessment must be coordinated with the Montana Board of Science and Technology Development, and a final report and recommendations must be presented to the Board by January 1, 1992."

This final report and recommendations have not yet been presented to the Board, and intellectual property programs and policies continue to differ at each unit. According to staff at the office of the CHE, a recent assessment of intellectual property management programs uncovered potential flaws in current policies. Before the Regents can recommend a consistent intellectual property management program for all units, CHE staff state that overall policies must be reconsidered and revised.

As shown on Table 6, MSTA has disbursed $55,458 and committed an additional $1,682,706 of PCT funds to research and development projects through December 31, 1991. Montana Entrepreneurship Center, which is a university-based Center of Excellence, is the only recipient to have received funds to date. Repayment of its loan will come from fees collected for use of their data base and services provided to the Montana Private Venture Capital Network. MSTA

has committed an additional $1.18 million to the Centers of Excellence, including the $600,000 loan to the Center for Microbial Engineering Research at MSU which will be used as match for a National Science Foundation award, $350,000 to the Center of Excellence in Biotechnology at UM, and an additional $232,706 to the Montana Entrepreneurship Center. MSTA has also committed $500,000 to the Billings Deaconess Hospital for a medical research project. These loans will be repaid through a percentage of the income stream generated by the product or process developed through the research.

As in the seed capital program, proceeds from research and development loans are deposited according to statutes governing the funding source. All payback from projects funded with pre-White money are deposited into the MSTA state special revenue account (and subsequently to the general fund if payback results in a balance greater than $50,000 in that account per action taken during the 1992 special session). Principal payback from projects funded with PCT funds (post-White) goes to the PCT fund with interest earnings deposited 85 percent in the general fund and 15 percent in the school equalization account. Table 7 shows the payback to date from research and development projects, according to how deposited upon receipt at MSTA.

TABLE 7
Amount Received from Research & Development Projects

	MSTA Special Revenue Account	General Fund/SEA	Total
Principal Payback	$4,819	$0	$4,819
Earnings	0	0	0
TOTAL	$4,819	$0	$4,819

Principal payback consists of payments made to MSTA as a percentage of product/product income stream, which are not considered ROI (earnings) until the state's original investment has been repaid.

To date, MSTA has received a 0.19 percent return on the $2.6 million in pre- and post-White research and development grant and loan funds disbursed. Since there are not maturity dates for these loans, it is impossible to determine when any further returns will be received.

The Montana Science and Technology Policy and Plan

A third program is evolving at MSTA: implementation of the Montana Science and Technology Plan. This plan, created in 1991 by an science and technology development task force selected by the Governor in conjunction with MSTA and the Board, is designed to be an action plan to guide Montana's science and technology development into the twenty-first century through a strong science and technology presence. A steering committee, the Montana Science and Technology Advisory Council, was established to oversee implementation of the plan with MSTA staff support.

The Science Plan consists of six steps:

1) public education and awareness;

2) development of strategies to generate economic development in seven resource areas: mineral extraction and processing, forestry and wood products, agriculture, energy, communications and manufacturing, biotechnology, and basic research;

3) fundraising;

4) human resource development;

5) transfer of intellectual property to the public and establishment of effective networking of resources; and

6) institutionalization of the science and technology policies developed through the plan.

No funds were specifically appropriated for the Science Plan. Since December, 1990, MSTA has provided $25,689 from its general fund operating budget and the Board has spent an additional $50,128 from its state special revenue account for Science Plan development and implementation activities. Implementation, which is scheduled for completion by the end of the 1993 session, is currently on schedule. However, MSTA staff state that due to budget cuts and the state special revenue account cap implemented during the 1992 special session, plan activities may begin falling behind schedule in fiscal 1993.

COST OF MSTA AND RETURNS RECEIVED

MSTA Costs and Direct Returns on Investment

Foregone Interest

In evaluating the current costs of the MSTA program it is important to include foregone interest. Until loaned by MSTA, PCT funds are invested in long-range securities, which yielded 12.7 percent in 1991.[1] PCT interest is distributed 85 percent to the general fund and 15 percent to the SEA. Once funds are disbursed to a seed capital or research and development project, no return on that investment may be received for seven years or more. During this period, the state forgoes a considerable amount of interest income, reducing general fund and SEA revenues. The MSTA program is based on the assumption that future returns on those investments will more than compensate the state for the interest foregone in the early years. Table 8 shows an estimate of cumulative foregone interest through fiscal year 1996, based on the following assumptions: 1) MSTA's estimated schedule for disbursing the $12.6 million of PCT by June 1994; and 2) long-term interest rates as forecast by Wharton Econometrics (February 1992).

TABLE 8
Cumulative Foregone Interest
Fiscal Years 1992 - 1996

	FY92	FY93	FY94	FY95	FY96
Estimated Amount of Lost Interest	$504,760	$1,092,181	$1,719,980	$2,362,179	$3,004,378

[1] Per Board of Investments 1991 annual report regarding Coal Trust Fund interest earnings.

As previously noted, MSTA may not receive any significant return from its investment of $12.6 million PCT funds before fiscal 1997. Sixty-three percent of the active seed capital projects have loan maturity dates of 1996 and beyond, and one (GeoResearch) has no loan maturity date at all. For research and development loans, there are no dates by which repayment must begin.

Total Cost and Direct Returns

Table 9 shows the expenditures of the MSA program (including administrative costs, grants, and foregone interest) and the funds invested from the program's inception through fiscal 1992, compared to direct return on investment to date. During these seven years, the program has cost $3.1 million and has invested $6.8 million. Total direct return during the period has been ($71,294), which is the net of $18,706 ROI and the loss of $90,000 through project failures.

TABLE 9
MSTA Cost and Return

Cost	Coal Tax Funds*	Other funds**	Total
Administration	$0	$2,166,438	$2,166,438
Grants		471,810	471,810
Loans	3,869,883	2,951,548	6,821,431
Foregone PCT Interest	504,760		504,760
TOTAL COST	$4,374,643	$5,589,796	$ 9,964,439
Direct Return			
ROI	$10,955	$7,751	$18,706
Failed Projects	0	(90,000)	(90,000)
TOTAL DIRECT RETURN	$10,955	($82,249)	($71,294)
PERCENT RETURN			(.7%)

*post-White
**pre-White

Administration includes actual expenditures through the end of fiscal year 1991 and the fiscal year 1992 appropriation, as shown on Table 1. Grants and loans include investments through December 31, 1991, plus the additional amount of PCT funds MSTA estimates will be disbursed by the end of fiscal year 1992 ($350,000 in the seed capital program and $700,000 in the research and development program).

Direct return is the total lost or remitted to MSTA as of December 31, 1991.

Indirect Returns

In addition to the direct returns identified in Table 9 above, MSTA staff note that Montana has realized indirect benefits from its investments. Table 10 presents information on indirect benefits to Montana's economy from MSTA investments. This unaudited information was derived from funding recipients in response to a request from MSTA. Not all funding recipients responded, and not all responded completely.

TABLE 10
Indirect Benefits, As Reported By Loan Recipients

Type of Benefit	Result of Seed Capital Project	Result of R&D Project	Total
JOBS			
Fulltime	151	72	223
Parttime	13	101	114
TOTAL JOBS	164	173	337
FINANCIAL IMPACT			
Annualized Wages	$3,451,004	88,206*	3,539,210
Project-Generated Revenue	5,153,968	10,830,725	15,984,693
Matching Funds	3,204,650	2,615,481	5,820,131
Non-Owner Equity Invstmts	7,042,800		7,042,800
TOTAL REPORTED FINANCIAL IMPACT	$18,852,422	$13,534,412	$32,386,834

*The only wages reported for research and development projects were $88,206 for six jobs at the University of Montana. Other respondents identifying jobs created did not submit information on the amount of wages paid.

The jobs shown in the table are those reported as existing in December 31, 1991 in the seed capital and research and development projects. MSTA staff jobs

are not included on the table. Annualized wages include seed capital projects' reported monthly payroll as of September, 1991, multiplied by twelve months.

Project generated revenue includes: 1) from seed capital projects: product sales, royalties, grants, research and contract revenue, and any other revenue generated since MSTA's investment; and 2) from research and development projects: sales, royalties, contract work, leveraged funds and follow-along grants received since MSTA's investment.

Matching funds for seed capital projects is the 1:1 required match for all loan funds dispersed. Research and development matching funds are as listed in the 1989 MSTA biennial report, plus match for the disbursals since then ($77,822).

Non-owner equity is all other "outside" investment capital generated by seed capital companies since inception, and includes cash provided by non-founders to purchase shares of company stock, warrants (which give them a right to purchase company stock for a specified price for a specific length of time), and/or other conversion rights to purchase company stock.

It is difficult to determine if the reported indirect benefits: 1) would have occurred without the receipt of MSTA funding; and 2) are entirely due to MSTA funding. Several of the projects received funding from other state and local economic development programs. For example, two of the projects have also received Community Development Block Grant funds.

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Montana Science & Technology Alliance

Stan Stephens, Governor

March 30, 1992

Teresa Olcott Cohea
Legislative Fiscal Analyst
State Capitol
Helena, MT 59620

Dear Ms. Cohea:

In response to the Draft Report regarding the Montana Science and Technology Alliance, I have prepared both some general comments and a number of very specific items which may require some attention.

On a general basis, I find that neither in the Purpose or Background sections of the report is there any discussion regarding the intent of the program or the venture capital nature of the program. It is important to couch the activities and outcomes in respect to the original legislative intent for the science and technology development initiatives which began in the mid-80s and were reinforced by two Governors and the Legislature again in 1989 and 1991. The provision of high risk, gap financing to help start-up both new research and new high growth companies was a visionary endeavor. Building into the statutes a strong set of safeguards to ensure that the Science and Technology Development Board mitigates risk to the greatest extent possible has created a process which meets both the fiduciary responsibilities required of such investing but also ensures that in fact, investments are made that will show strong propensity for payback and other more indirect economic benefits, i.e., jobs, taxes, contracts, leveraged new-monies, etc.

Investments is the key word here. We are looking at long-term transactions (3-7 years) before the portfolio companies are established well enough to begin to see the values increase and the potential for payback to be visible. Only since the White case (or in mid-1989) has MSTA really been putting its seed capital dollars to work. Of the approximately $3.2 million in seed all but $415,000 was invested since mid-1989. Therefore, most of our invested dollars have only been at work for periods less than 2 and one-half years. On a cycle where 3-7 years begins to show the real worth of a portfolio, we are quite new at it.

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In research and development, those investments involving the Centers of Excellence, where a payback provision is included in our funding, we are again only involved since the 1989 time frame. The latest legislative approvals of $5.1 million for research and development only occurred in 1991 and those dollars are just now being disbursed.

Additionally, in high risk financing, such as this, there is a rule of winners and losers. Basically, out of 10 portfolio companies, 3 will be total losses, 3 will be "walking dead" (alive but no payback), 3 will show return on principal but little real upside return and one will be a real "big hit." This big hit will need to carry the others. This is the nature of investing in early-stage companies. The risk is high but the potential for reward can also be high, if the investment process is thorough and the funds and portfolio are well managed. We believe we are doing all the right things the right way. Time will tell whether the financial returns will be at the levels envisioned by the policy-makers when the program was created and as it continued on its path.

One should admit, however, that the signs are good - none of our post-White deals have failed, 3 or 4 have an extremely large upside potential and our indirect benefits of $32 million+ financial impact and 337 full and part-time jobs show strong leverage and impact here in the state's economy. The program is also diversifying our base as was hoped in the beginning by funding new, technology-oriented businesses and stimulating research in the university, medical and private sectors.

It certainly would add to the value of the report if either opening or summary remarks could be added to the other material that would leave the reader with some idea of how the program is working both in relation to its original intent and to the greater outside world of venture financing.

Attached is my specific list of items that relate to the details of the report. These need not be attached to the report for distribution to the Committee. However, I would appreciate inclusion of these general remarks in the Committee's packet of data.

Thank you for allowing me to respond in this situation and thank you for Terri Perrigo's diligence and cooperation throughout this effort. We at MSTA look forward to working with your office and the Finance Committee on future matters relevant to this program.

Sincerely,

Carl E. Russell

Carl E. Russell
Executive Director

cc: Chuck Brooke, Department of Commerce
Board of Science and Technology Development